II. CLAIM AMENDMENTS

1. (Currently Amended) A method for performing the operations for synchronizing a positioning receiver with a received code-modulated spread spectrum signal, the method comprising:

using at least one reference code, which reference code corresponds to a code used in the modulation, acquiring the frequency shift of the received signal and the code phase of the code used in the modulation,

taking samples from the received signal for forming at least two sample vectors,

forming a first Fast Hartley transform on the basis of said reference code, and a second Fast Hartley transform on the basis of each sample vector,

performing a multiplication between the first Fast Hartley transform formed on the basis of said reference code and the second Fast Hartley transform formed on the basis of each sample vector,

performing an inverse Fast Hartley transform on each multiplication result, and

acquiring the frequency shift and code phase on the basis of the inverse Fast Hartley transforms of the multiplication results,

wherein in said sample vector formation, correlation and analysis are repeated for forming at least two coherent search matrixes, and a summing is also performed in the method, in which summing an incoherent search matrix is formed by summing incoherently the values of the equivalent elements of the coherent search matrix formed at each time of repetition, and said incoherent search matrix is used in said acquisition for acquiring the frequency shift and code phase.

2. (Previously Presented) A method according to Claim 1, wherein the frequency range to be examined is specified, the specified frequency range is divided into two or more parts, whereupon said sample vector formation and correlation are performed on each part, the method also comprises an analysis, in which values of the inverse Fast Hartley transforms of the multiplication results are saved for forming a coherent search matrix, the acquisition is performed after the examination of the specified frequency range, and the frequency shift and code phase are acquired on the basis of the highest value of the coherent search matrix.

3. (Previously Presented) A method according to Claim 2, wherein a threshold value is specified, and quantity values of the elements of the coherent search matrix that exceed said threshold value are used in the acquisition for acquiring the frequency shift and code phase.

4. (Cancelled)

5. (Previously Presented) A method according to Claim 4, wherein the frequency range to be examined is specified, the specified frequency range is divided into two or more parts, whereupon said sample vector formation, correlation, analysis and summing are performed on each part, and values of the elements of the incoherent search matrix are saved, and the acquisition is performed after the examination of the specified frequency range, and the frequency shift and code phase are acquired on the basis of the highest value.

6. (Previously Presented) A method according to Claim 4, wherein a threshold value is determined, and quantity values of the elements of the incoherent search matrix that

exceed said threshold value are used in the acquisition for acquiring the frequency shift and code phase.

7. (Previously Presented) A method according to claim 1, wherein an inverse code corresponding to said reference code is used in the correlation to form the first Fast Hartley transform.

8. (Previously Presented) A method according to claim 1, wherein an inverse code corresponding to each sample vector is used in the correlation to form the second Fast Hartley transform.

9. (Currently Amended) A positioning system, which comprises at least a positioning receiver, a synchronizer~~ation means~~ for performing synchronization operations to a received code-modulated spread spectrum signal, said synchronizer is configured to ~~means for use~~ing at least one reference code in connection with the synchronization, which reference code corresponds to a code used in the modulation, and ~~means~~ an acquisition element configured to ~~for~~ acquire~~ing~~ the frequency shift of the received signal and the code phase of the code used in the modulation, wherein the synchronize~~ration means~~ comprises:

- a sample vector formation circuit ~~means block~~configured to~~for~~ form~~ing~~ at least two sample vectors from the received signal,

- a correlator~~ion means~~ comprising

  - a time-to-frequency transformer configured to~~for~~ form~~ing~~ a first Fast Hartley transform on the basis of said reference code, and to~~for~~ form~~ing~~ a second Fast Hartley transform on the basis of each sample vector,

- a multiplier configured to ~~means for performing~~ a multiplication between the first Fast Hartley transform formed on the basis of said reference code and the second Fast Hartley transform formed on the basis of each sample vector, and

- an inverse Fast Hartley transformer configured to ~~means for performing~~ an inverse Fast Hartley transform on each multiplication result for forming a correlation function matrix, and

- an acquisition ~~means~~ element configured to~~for~~ acquire~~ing~~ the frequency shift and code phase by using the values of the inverse Fast Hartley transforms of the multiplication results,~~:~~

wherein said synchronizer is configured to repeat said formation of sample vectors, formation of a correlation function matrix and formation of a coherent search matrix at least two times for forming a coherent search matrix, and the receiver also comprises a summing element configured to form an incoherent search matrix by summing the values of the equivalent elements of the coherent search matrix formed at each time of repetition, and said acquisition element is configured to use said incoherent search matrix in determining the frequency shift and code phase.

10. (Previously Presented) A positioning system according to Claim 9, wherein the received signals are signals transmitted by satellites of the GPS system.

11. (Currently Amended) A positioning system according to Claim 9, which comprises a data transfer network, and at least part of the synchronize~~ration means are~~ is formed in connection with the data transfer network, and a data transfer connection is arranged to be established between the data transfer network and the receiver.

12. (Previously Presented) A positioning system according to Claim 11, wherein the data transfer network comprises a mobile communication network.

13. (Currently Amended) A positioning system according to Claim 9, wherein the synchronizeration means is are formed in the receiver.

14. (Currently Amended) A positioning receiver, which comprises at least a synchronizer ation means for performing synchronization operations to a received code-modulated spread spectrum signal, said synchronizer is configured toreceiver has means for useing at least one reference code in connection with the synchronization, the reference code corresponding to a code used in the modulation, and an acquisition element configured to means for acquireing the frequency shift of the received signal and the code phase of the code used in the modulation, the synchronizeration means comprising:

- a sample vector formation circuit configured tomeans for forming at least two sample vectors from the received signal,
- a correlatorion means comprising a time-to-frequency transformer configured to for forming a first Fast Hartley transform on the basis of said reference code, and for to forming a second Fast Hartley transform on the basis of each sample vector, a multiplier configured to means for performing a multiplication between the first Fast Hartley transform formed on the basis of said reference code and the second Fast Hartley transform formed on the basis of each sample vector, and an inverse Fast Hartley transformer means configured to for performing an inverse Fast Hartley transform on each multiplication result for forming a correlation function matrix, and

- an acquisition element configured to~~means for~~ acquir~~eing~~ the frequency shift and code phase by using the values of the inverse Fast Hartley transforms of the multiplication results,~~:~~

wherein said synchronizer is configured to repeat said formation of sample vectors, formation of a correlation function matrix and formation of a coherent search matrix at least two times for forming a coherent search matrix, and the receiver also comprises a summing element configured to form an incoherent search matrix by summing the values of the equivalent elements of the coherent search matrix formed at each time of repetition, and said acquisition element is configured to used said incoherent search matrix in determining the frequency shift and code phase.

15. (Currently Amended) A receiver according to Claim 14, further comprising:

- ~~means for~~ a circuit configured to specifying the frequency range to be examined, a circuit configured to divide ~~means for dividing~~ the specified frequency range into two or more parts, whereupon the formation of the sample vectors and the formation of the correlation function matrix are arranged to be performed for each part,

- ~~means for~~ a circuit configured to form~~ing~~ a coherent search matrix,

- a circuit configured to ~~means for saving~~ save the values of the elements of the coherent search matrix, and

- a circuit configured to determine ~~means for determining~~ the frequency shift and code phase on the basis of the highest value of the coherent search matrix.

16. (Currently Amended) A receiver according to Claim 14, further comprising a circuit configured to ~~means for~~ specify~~ing~~ the threshold value, and a circuit configured to compare~~means for comparing~~ the values of said threshold value and the values of said coherent search matrix for determining the frequency shift and code phase.

17. (Cancelled)

18. (Currently Amended) A receiver according to Claim 14, further comprising:

- a circuit configured to ~~means for~~ specify~~ing~~ the frequency range to be examined,
- a circuit configured to divide ~~means for dividing~~ the specified frequency range into two or more parts, whereupon the formation of the sample vectors and the formation of the correlation function matrix are arranged to be performed for each part,
- a circuit configured to form ~~means for forming~~ a coherent search matrix,
- a circuit configured to sum ~~means for summing~~ the coherent search matrix to the incoherent search matrix,
- a circuit configured to save ~~means for saving~~ the values of the elements of the incoherent search matrix, and
- a circuit configured to determine ~~means for determining~~ the frequency shift and code phase on the basis of the highest value.

19. (Currently Amended) A receiver according to Claim 18, further comprising a circuit configured to ~~means for~~ specify~~ing~~ the threshold value, and a circuit configured to compare~~means for comparing~~ the values of said threshold value and the values of said incoherent search matrix for determining the frequency shift and code phase.

20. (Currently Amended) A receiver according to claim 14, wherein the ~~correlation means~~ correlator comprises a circuit configured to form ~~means for forming~~ a Fast Hartley transform of the inverse code corresponding to said reference code.

21. (Currently Ameded) A receiver according to claim 14, wherein the correlator ~~correlation means~~ comprises a circuit configured to form ~~means for forming~~ a Fast Hartley transform of the inverse code corresponding to each sample vector.

22. (Currently Amended) An electronic device, which comprises at least a location determination positioning receiver, a synchronizer~~ation means~~ for performing synchronization operations of the location determination receiver to a transmitted code-modulated spread spectrum signal, and in which the location determination receiver ~~includes means for~~is configured to use~~ing~~ at least one reference code in connection with the synchronization, the reference code corresponds to a code used in the modulation, and the electronic device comprises an acquisition element configured to ~~means for~~ determine~~ing~~ the frequency shift of the transmitted signal and the code phase of the code used in the modulation, wherein the synchronizer~~ation means~~ comprises:

- sample vector formation circuit configured to~~means for~~ form~~ing~~ at least two sample vectors from the received signal,
- correlator~~ion~~ comprising ~~means for~~ a time-to-frequency transformer configured to form~~ing~~ a first Fast Hartley transform on the basis of said reference code, and ~~for~~ to form~~ing~~ a second Fast Hartley transform on the basis of each sample vector, a multiplier configured to~~means for~~ perform~~ing~~ a multiplication between the first Fast Hartley transform formed on the basis of said reference code and the second Fast Hartley transform formed on the basis of each sample vector, and an inverse Fast

Hartley transformer configured to~~means for~~ performing an inverse Fast Hartley transform on each multiplication result for forming a correlation function matrix, and

- acquisition element configured to~~means for~~ acquireing the frequency shift and code phase by using the values of the inverse Fast Hartley transforms of the multiplication results,~~;~~

wherein said synchronizer is configured to repeat said formation of sample vectors, formation of a correlation function matrix and formation of a coherent search matrix at least two times for forming a coherent search matrix, and the receiver also comprises a summing element configured to form an incoherent search matrix by summing the values of the equivalent elements of the coherent search matrix formed at each time of repetition, and said acquisition element is configured to use said incoherent search matrix in determining the frequency shift and code phase.

23. (Currently Amended) An electronic device according to Claim 22, which comprises a circuit configured to determine ~~means for determining~~ the location of the electronic device and a circuit configured to save ~~means for saving~~ the location information, wherein the electronic device also comprises a circuit configured to specify ~~means for specifying~~ the frequency range to be examined, and a circuit configured to select ~~means for selecting~~ the starting frequency from said frequency range on the basis of the location information saved in the receiver.

24. (Currently Amended) An electronic device according to Claim 22, wherein the correlator ~~correlation means~~ comprises a circuit configured to form ~~means for forming~~ a Fast Hartley transform of the inverse code corresponding to said reference code.

25. (Currently Amended) An electronic device according to Claim 22, wherein the correlator ~~correlation means~~ comprises a circuit configured to ~~means for form~~forming a Fast Hartley transform of the inverse code corresponding to each sample vector.

26. (Currently Amended) An electronic device according to Claim 22, further comprising a circuit configured to perform ~~means for performing~~ data transfer operations.

27. (Currently Amended) An electronic device according to Claim 26, further comprising a circuit configured to establish ~~comprising means for establishing~~ a data transfer connection to a data transfer network, and~~whereby~~ the a circuit configured to determine ~~means for determining~~ the location of the electronic device ~~comprise~~ including a circuit configured to transmit ~~means for transmitting~~ information needed in the location determination to the data transfer network, and a circuit configured to retrieve ~~means for retrieving~~ information used in the location determination from the data transfer network, whereby at least part of the location determination operations are arranged to be performed in the data transfer network.

28. (Currently Amended) An electronic device according to Claim 26, wherein the circuit configured to perform ~~means for performing~~ data transfer operations comprises a circuit configured to perform ~~means for performing~~ mobile station operations.

29. (Currently Amended) An electronic device, which comprises at least a positioning receiver and which electronic device is intended for use in connection with a positioning system, which comprises a synchroniz~~eration means~~ for performing synchronization

operations of the receiver to a transmitted code-modulated spread spectrum signal, said synchronizer is configured to~~means for~~ use~~ing~~ at least one reference code in connection with the synchronization, the reference code corresponding to a code used in the modulation, a circuit configured to determine ~~means for determining~~ the frequency shift of the transmitted signal and the code phase of the code used in the modulation, and a data transfer network, wherein the electronic device also comprises a sample vector formation circuit configured to~~means for~~ form~~ing~~ at least two sample vectors from the received signal, and a transmitter~~ssion means~~ for transmitting the sample vectors and time information to the data transfer network, and the positioning system also comprises:

- a correlator~~ion~~ comprising a time-to-frequency transformer configured to ~~means for~~ form~~ing~~ a first Fast Hartley transform on the basis of said reference code, and ~~for~~ to form~~ing~~ a second Fast Hartley transform on the basis of each sample vector, a multiplier configured to~~means for~~ perform~~ing~~ a multiplication between the first Fast Hartley transform formed on the basis of said reference code and the second Fast Hartley transform formed on the basis of each sample vector, and an inverse Fast Hartley transformer configured to~~means for~~ perform~~ing~~ an inverse Fast Hartley transform on each multiplication result for forming a correlation function matrix, and

- an acquisition element configured to~~means for~~ acquire~~ing~~ the frequency shift and code phase by using the values of the inverse Fast Hartley transforms of the multiplication results,~~;~~

wherein said synchronizer is configured to repeat said formation of sample vectors, formation of a correlation function matrix and formation of a coherent search matrix at least two times for forming a coherent search matrix, and the receiver also comprises a summing element configured to form an incoherent search matrix by summing the values of the equivalent elements of the coherent search matrix formed at each time of repetition, and said acquisition element is configured to use said incoherent search matrix in determining the frequency shift and code phase.

30. (Currently Amended) An electronic device according to Claim 29, further comprising a circuit configured to receive ~~reception means for receiving~~ information about the acquired frequency shift and code phase from the data transfer network.

31. (Currently Amended) An electronic device according to Claim 29, which is intended for use in connection with a positioning system, and which also comprises a circuit configured to determine ~~means for determining~~ the location of an electronic device, and a circuit configured to receive ~~means for receiving~~ location information from the data transfer network.

32. (Currently Amended) An electronic device according to Claim 29, wherein the ~~means for performing~~ data transfer networkoperations comprises a circuit configured to perform ~~means for performing~~ mobile station operations.

33. (Previously Presented) A method for performing the operations for synchronizing a positioning receiver with a received code-modulated spread spectrum signal, the method comprising:

using at least one reference code, which reference code corresponds to a code used in the modulation,

acquiring the frequency shift of the received signal and the code phase of the code used in the modulation,

taking samples from the received signal for forming the sample vectors,

forming a first Fast Hartley transform on the basis of said reference code, and a second Fast Hartley transform on the basis of each sample vector,

performing a multiplication between the first Fast Hartley transform formed on the basis of said reference code and the second Fast Hartley transform formed on the basis of each sample vector,

performing an inverse Fast Hartley transform on each multiplication result, and

acquiring the frequency shift and code phase on the basis of the inverse Fast Hartley transforms of the multiplication results,

wherein in said sample vector formation, correlation and analysis are repeated for forming at least two coherent search matrixes, and a summing is also performed, in which summing an incoherent search matrix is formed by summing incoherently the values of the equivalent elements of the coherent search matrix formed at each time of repetition, and said incoherent search matrix is used in the acquisition for determining the frequency shift and code phase.

34. (Previously Presented) A positioning receiver, which comprises at least synchronization means for performing synchronization operations to a received code-modulated spread spectrum signal, said receiver has means for using at least one reference code in connection with the synchronization, the reference code corresponding to a code used in the modulation, and means for acquiring the frequency shift of the received signal and the code phase of the code used in the modulation, the synchronization means comprising:

– sample vector formation means for forming at least two sample vectors from the received signal,

– correlation means for forming a first Fast Hartley transform on the basis of said reference code, and for forming a second Fast Hartley transform on the basis of each sample vector, means for performing a multiplication between the first Fast Hartley transform formed on the basis of said reference code and the second Fast Hartley

transform formed on the basis of each sample vector, and means for performing an inverse Fast Hartley transform on each multiplication result for forming a correlation function matrix, and

– acquisition means for acquiring the frequency shift and code phase by using the values of the inverse Fast Hartley transforms of the multiplication results,

wherein in said formation of sample vectors, formation of a correlation function matrix and formation of a coherent search matrix are arranged to be repeated at least two times for forming a coherent search matrix, and the receiver also comprises summing means for forming an incoherent search matrix by summing the values of the equivalent elements of the coherent search matrix formed at each time of repetition, and said incoherent search matrix is used in the acquisition for determining the frequency shift and code phase.